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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/190,208	11/13/1998	JIASHU CHEN	CHEN3-1	6397

7590 07/27/2004

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EXAMINER	
LAO, LUN S	

ART UNIT	PAPER NUMBER
2643	23

DATE MAILED: 07/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/190,208	CHEN ET AL.	
	Examiner	Art Unit	
	Lun-See Lao	2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. Claims 1-14 remain pending. This action is in response to the amendment filed on 04-20-2004. Claims 1, 3, 5-9 and 11-13 have been amended.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Myers (US PAT. 4,817,149) in view of Matsumoto (US PAT. 5,381,482).

Consider claim 1, Myers teaches a digital delay line for use (in any event, " for use" is not a positive structural limitation) in a 3D audio sound system, comprising:

a first delay module (time delays TD 118, shown in fig.20) providing a choice of delay within a first resolution for use (in any event, " for use" is not a positive structural limitation) in said 3D audio sound system (see col.13 lines 35-68);

a second delay module (VAR TD 104) in series with said first module (fig. 1, 104 and 116 which is comprised of 118s), said second delay module providing a choice of a plurality of additional fractional delays (VAR TD shown in fig.1 as 104 and shown in

more detail in fig.20 having 120, 122, ..., 134, wherein the values of VAR TD range from 0.0 to 0.67ms) (col.13 lines 35-68),

wherein said first resolution is added (~~via mixer 168~~ adders 136, 138, fig. 20) to said additional fractional delays (TD + 0.67ms (VAR TD)) for use in said 3D audio sound system to create a perceived positional sound (see col.6 lines 23-55; col.13 lines 35-68).

Myers does not teach that the first delay takes a digital integer value, nor does Myers explicitly teach that the first and the second time delays operate in digital fashion.

Matsumoto teaches adding two delays (fig. 4), one being a digital integer delay (DLY 40 with 20 ms), and the other being a digital fractional delay (DLY 32, 33, having value of 0.7ms). In Matsumoto a second delay module (32, 33) produces an additional delay (0.7ms) which is a fraction of / less than a first delay (20ms) produced by a first delay module (DLY 40) in series. See col. 9, line 15 – col. 10, line 55. Further in Matsumoto, delays are digital delays in that they are placed between A/D converter 21 and D/A converters 23, 24.

Therefore, it would have been obvious to use an integer value for the first delay and to operate the first and the second time delays in digital fashion in Myers. One of ordinary skill in the art would have been motivated to combine the teachings of Myers and Matsumoto because this would have made the reproduced sound appear more naturally (Matsumoto, col. 1, lines 45-52).

Consider claims 2-4 and 6, Myers teaches the digital delay line for use (in any event, " for use" is not a positive structural limitation) in a 3D audio sound system of first delay module comprises: a first-in, first out buffer (see fig.20 (TD)); and the digital delay

line for use in a 3D audio sound system of second delay module comprises: a choice of any one of a plurality of polyphase filters (see fig.20, (TD and VAR TD)), each of said polyphase filters providing an additional fraction inherently (by positional control computer set up) delay less than said first resolution (see col.13 lines 35-68); and the digital delay line for use in a 3D audio sound system of further comprising: a localization control module comprising an interaural time delay look-up table associating desired sound source locations with a particular interaural time delay (see fig.15 and col.9 lines 49-63) and the digital delay line for use (in any event, " for use" is not a positive structural limitation) in a 3D audio sound system the first digital resolution is based on a sampling rate of a digital audio signal (see fig.20 (118, TD) and col.13 lines 35-68).

Consider claim 5, Myers teaches the digital delay line for use (in any event, " for use" is not a positive structural limitation) in a 3D audio sound system of the localization control module further comprises: a delay selector to determine the delay time (see fig.1, 200 such as control computer), but Myers does not clearly teach that an integer and fractional delay selector adapted to determine a first digital time delay for use (in any event, " for use" is not a positive structural limitation) by said first delay module and said additional fractional delay for use by said second digital delay module. However, Matsumoto teaches that an integer (see fig.4 (40)) and fractional delay (32,33) selector (to select between integer and fractional) adapted to determine a first digital time delay for use by said first delay module (40) and said additional fractional delay (32,33) for use by said second digital delay module (32,33)(col.9 line 54-col.10, line 38).

Therefore, it would have been obvious to use an integer value for the first delay and to operate the first and the second time delays in digital fashion in Myers. One of ordinary skill in the art would have been motivated to combine the teachings of Myers and Matsumoto because this would have made the reproduced sound appear more naturally (Matsumoto, col. 1, lines 45-52).

Consider claim 11, Myers teaches an apparatus for providing an interaural time delay in a digital 3D sound system, comprising:

means for selecting one of a plurality of available first time delays (TDs 118, shown in fig.20) having a first resolution between each of said plurality of available first time delays (see col.13 lines 35-68), said first resolution providing a rough estimate of a desired interaural time delay (col. 10, lines 28-44);

means for additionally selecting one of a plurality of available second time delays (VAR TD shown in fig.1 as 104 and shown in fig.20 as 120, 122, ..., 134, wherein the values of VAR TDs range from 0.0 to 0.67ms), each of said plurality of available second time delays being a fraction delay providing a highly refined additional interaural time delay (VAR TD ranges from 0.0 to 0.67ms) (col.13 lines 35-68; col. 10, lines 28-44); and

means for adding (~~mixer 168, fig.1~~) adders 136, 138, fig. 20 said selected first digital time delay and said second digital time delay (TD + 0.67ms (VAR TD)) to provide a desired interaural time delay for use in said digital 3D sound system to create a perceived positional sound (see col.6 lines 23-55).

Myers does not teach that the first delay is a digital integer value, nor does Myers explicitly teach that the first and the second time delays operate in digital fashion.

Matsumoto teaches adding two delays (fig. 4; col. 9, line 15 – col. 10, line 55), one being an integer delay (DLY 40 set at 20ms), and the other being a fractional delay (DLY 32, 33, having value of 0.7ms). In Matsumoto, delays are digital delays (operate between A/D converter 21 and D/A converters 23, 24). Matsumoto teaches the digital integer delay providing a rough estimate of a desired interaural time delay in that the digital integer delay values are determined to be 20 ms based on estimated interaural time delays (col. 3, line 64 – col. 4, line 43; col. 9, line 65 – col. 10, line 10).

Therefore, it would have been obvious to use an integer value for the first delay and to operate the first and the second time delays in digital fashion in Myers. One of ordinary skill in the art would have been motivated to combine the teachings of Myers and Matsumoto because this would have made the reproduced sound appear more naturally (Matsumoto, col. 1, lines 45-52).

Consider claims 12-14, Myers teaches the apparatus for providing an interaural time delay in a digital 3D sound system of desired interaural time delay relates (see fig.1 116 which is fig.20) to a desired interaural time delay (see fig.1, 104 which is fig.15)) for one ear of a listener (see fig.1, (190L or 192R)); and said first time delay (see fig.1, 116 which is fig.20 (TD+ 0.67millisecond (VAR TD)) relates to a desired interaural time delay (see fig.1, 104 which is fig. 15) for a second ear of said listener (see fig.1, (190L or 192R) and col.13lines 35-68); and the plurality of available time delays are based on a sampling rate of a digital audio signal (see fig.20,(120, 122, 124, 126, 128, 130, 134)(VAE TD)); and the apparatus for providing an interaural time delay in a digital 3D sound system comprises:

means for fixing (0.67 millisecond delay independently) a first interaural time delay (fig.1, 116 which is fig.20, and col.13 lines 35-68) with respect to a first ear of a listener (see fig.1 (190R or 192L)); and

means for providing said -desired interaural time delay (see fig.1, 104 which is fig. 15) with respect to a second ear (see fig.1 (190R or 192L)) of said listener (see col.9 lines 50-63).

Consider claims 7-10, these are method claims of claims 11-14, respectively. Thus note claims 11-14, respectively, for rejections.

Response to arguments

5. Applicant's arguments filed on 04/20/2004 have been fully considered but they are not persuasive.

Regarding claims 1-4 and 6, applicant argued that Myers does not teach digital time delay, in series and added together (remarks, pages 6, sixth paragraph).

The examiner respectfully disagrees. Myers indicates digital operations (see col.8 line 45-54) and a/d and d/a converters are well known in the art. Mayers teaches the time delays operate in series (see fig.20 116(TD)) and are added together (see fig. 20, 116 (TD) added to 120-134(VAR TD)). See col. 13 line 35-col.14 line 8.

Regarding claims 1-4 and 6, applicant argued that Matsumoto uses integer delay values in one path of a sound signal and fractional delay values in a second separate path of the sound signal and the integer delay and fractional delay are not in series to be added together (see remark page 7 third and fourth paragraph).

The examiner respectfully disagrees. Matsumoto teaches the digital integer delay 40 (see fig.4) is in series with digital fractional delay 32 which are added by 40 and passes thought 23 and 20 to produce output from 6, thus creating a positional sound as recited by claims 1-4 and 6-14 (see col.9 line 54-col.10 line 38)

Applicant further argued that modification of Myers with components from Matsumoto, ie, modifying an analog time delay system with digital components, is inoperable (see remark page 7, seventh paragraph - page 8, first paragraph, page 8, third – fourth paragraphs).

The examiner respectfully disagrees. First, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. In this case, it is the concept of making the first delay an integer value and the concept of operating the first and second time delays in digital fashion of Matsumoto that are applied to Mayers. Further, it is well known in the art that to make a digital signal from an analog signal an A/D converter is used and that a computer controls the time delay in the analog or digital systems. Both Mayers' and Matsumoto's systems are head-related sound systems. Therefore, the combination will be operable.

Applicant recited the conventional digital 3D sound systems and stated that by using two digital delays, an integer and a fractional, added together, the present invention overcomes the deficiencies of the prior art system. (remarks, page 8, 5th

paragraph – page 9, 2nd paragraph). The examiners' response is that the combination of Mayers and Matsumoto provides two digital delays, an integer and a fractional, added together, as discussed in the rejection of claim 1 and response above, therefore, providing the same advantages over the prior art systems.

Conclusion

6. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:(703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao,Lun-See whose telephone number is (703) 305-2259 The examiner can normally be reached on Monday-Friday from 8:00 to 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz, can be reached on (703) 305-4708.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 whose telephone number is (703) 306-0377.

Lao,Lun-See
Patent Examiner
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Crystal Park 2
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DUC NGUYEN
PRIMARY EXAMINER